

AVIATION

The Oldest American Aeronautical Magazine

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VOLUME
XXIV

Special Features

Campaigning for an Airport
The Martin "Eureka" Section
Notes on the Guggenheim Safety Competition

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NUMBER
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Insert—Lieut. Frank Schilt



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Lieut. Frank Schilt

Lieut. Frank Schilt, U. S. M. C. reports that, in a Vought "Corsair," he rescued a number of wounded Marines in the mountains of Nicaragua after landing and taking off for a total of ten trips on a rough, quickly prepared run-way 70 ft. wide by 300 ft. long. This improvised field was entirely surrounded by dense forests and high, rugged mountains.

Low landing speed, coupled with quick take-off, is best exemplified in ships equipped with the air-cooled radial engine, and is due primarily to low installed weight per horsepower. In hard service flying these characteristics are vital to the practical use of aircraft during actual engagement where perfect landing fields are never available. These same engine characteristics provide for the unmatched performance of the "Wasp" at altitude, and constitute the reasons for the "Wasp's" excellence in comparison to relatively heavier types of power plants.



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DEPENDABLE ENGINES



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No. 5

Obsolete Stocks

THE AERONAUTICAL industry has not as yet reached the stage where airplane dealers and flying field service stations carry large stocks of spare parts, etc., but with the rapid strides forward that are being made in reference to manufacturers obtaining actual distribution it does not seem far distant when such a condition will be necessary. And when that time comes, the service station manager in particular should be most careful in the selection of his stocks.

Quick turnover is the objective of the automotive service station and so will it be with the airplane service station. Slow selling and obsolete stocks are a drag on the profits for they represent stagnant capital. One way to prevent such a condition, or at least alleviate it to a considerable degree, will be for the service station operator to make a sales analysis of his territory and determine as near as possible what parts he should stock. Another way, and perhaps one which might be used in connection with this territory analysis, would be for the service station operator to keep a strict check on the moving of his stock by the installation of a perpetual inventory system. By it he can tell what is moving fast and what is not. It will also give him some idea as to when he should expect seasonal depressions, and prove a most valuable guide in his buying of additional stocks of engine there is an expenditure connected with the operation of a perpetual inventory—the exact amount being dependent upon the individual concern—but if sustained with a fair amount of accuracy it will pay for itself before long. If in no other way than to enable the service station operator to work his capital instead of having part of it tied up in slow moving and obsolete stocks.

The New Schools

ALTHOUGH THERE have been many commercial flying schools scattered throughout the United States there were none up until 1917 which actually give a thorough and comprehensive course such as is necessary to train out a finished flier. The cause for this situation was the great reserve of war-trained fliers, the time with which an inexperienced pilot could go out and learn, and the lack of demand for well-trained pilots. The competition between the many schools resulted in their competing to see which could add their students (in the least money) and apparently there was not a sufficient demand for adequate training to warrant a first class school. It has now become a generally accepted idea that nothing compares the duty of a school and that three or four hundred dollars is an ample charge for the turning out of a pilot.

There is beginning to be a change however and sev-

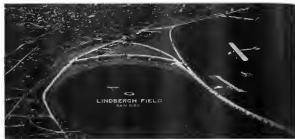
eral schools are trying to establish courses which will really turn out well-trained fliers. This is now possible because there is no longer an unlimited reserve of war time pilots and what is more important there is a demand for skilled pilots from our transportation lines, from flying fields and schools and from large non-aeronautical companies which are using planes in their business. The Department of Commerce regulations and the collection of cheap war surplus planes is also making it much easier for a pilot to merely use and then going out and earning money while he is getting his experience and training. The old type school who merely added their students will continue to do so larger a business at once in instructing private owners and those who wish to learn how to fly as an addition to their business but the school training of those who expect to become professional fliers will certainly become more elaborate.

The new type of school will have to overcome the ideas which have become firmly imbedded during the past years. They will have to persuade would-be students that there is a great deal that can be brought to a school. They will have to teach a great deal of theory as well as giving several hundred hours of actual flying. They will have to think out a great many things in the same way as any professional engineer or in the military flying schools. All this will cost money but a professional flier who can fly all kinds of planes in all kinds of weather is not made in a day.

On the Engine Situation

WAR SURPLUS engines are becoming very scarce. Airplane manufacturing programs are being retarded by the lack of available power plants and engine designers are making every effort to develop a product to meet this demand. Early we hear of new air-cooled engines under development. It is inevitable that some of these will not come up to standard and should they find their way into service before they are fully developed, a considerable amount of harm will be done. Poor plane failures, which perhaps might not disintegrate, or at least not so severely, as they would if they were the product of the prestige of both the airplane and engine manufacturer. At the same time the industry as a whole suffers through the loss of public confidence.

For a long time the aeronautical industry has been endeavoring to increase the confidence of the public in the possibilities of the airplane. During the past year aviation has found numerous new supporters, many of which will make their few flights in new production planes during the coming year. These people will be getting their first hand information in aeronautics and to destroy their confidence would be to lose the support of these who will help to make commercial aeronautics a paying industry.



An artist's drawing of what Lindbergh Field will look like when completed

Campaigning for an Airport

How the Air-minded of San Diego, Calif., Succeeded in Obtaining a \$650,000 Airport Bond Issue

By ANDREW H. DOONE

THROUGHOUT the United States nearly every progressive city is actively engaged in the work of constructing or promoting a municipal airport. No doubt many people not conversant with the importance of airports have wondered why there should be such a need for municipal airports. Several potent reasons can be offered, but the most important of these for any given community lies in the fact that others are lavishing every effort to construct adequate ports for aircraft. Each city of any size must keep step in the competition for supremacy if it plans to keep its place in the nation's progress.

Where towns and cities stand at the beginning of the road, the town and often of the nation stand today, with reference to development of air transportation for business, pleasure and mail. Almost every means of transportation in the United States has received material assistance from the Federal State or Municipal government. The railroads in extending their lines across the country, received millions of acres of land from the federal government. Likewise the automobile, the fastest parallel to air transportation has been assisted by the construction of roads. The airplane, while independent of road and rail connections is absolutely dependent on terminal facilities—the airport.

Cities have found it good likewise to provide paved streets

for automobile transportation, and to construct highways for these arteries have brought the automobile and consequent prosperity to their midst. Can it be doubted that property has followed the automobile and the town? Can it be doubted that property will follow in the wake of aerial development? The airplane is the most reliable of the automobiles; follows the lines of least resistance and patronizes those cities which establish adequate municipal landing fields.

Accommodated Ones Need No Selling

The government, through the department of commerce, is undertaking to develop commercial aviation in the United States by providing surveys of properly situated lands for air travel. It is, however, leaving to the initiative of municipalities establishment of local terminal facilities. To those so concerned intimately with the new industry of the air for airport need not be said. There are many cities—rural through the land who know so little about aviation that they not only could be sold an air transportation line as an airport or other development, but they must be kept "sold" until all time as the people have an opportunity to voice their approval of a forward-looking program. In the future the name of city development will undoubtedly be as dependent on the possession of an adequate airport as it has been in the past dependent on the development of adequate port facilities for

ships, the construction of roads and highways. An airport is the closest relation to air travel that port facilities bear a waterway. As the airport is designed to serve all types of traffic, it is usually necessary that it be a municipal installation. Usually the water had the opportunity to witness an important sign for a municipal airport which proved successful beyond the most sanguine hopes of its proponents. It was a sign in paint. The campaign took place in a small town, among normal American citizens and the vision needed in the efforts of the "city-planning committee" as our group would be expected by an advertising man to refer to the efforts to sell a product.

An Airport Must Be Sold

The airport is a product. Unfortunately it must be sold, cheap, but in time to meet them. Some considerable effort is necessary to "sell over" an airport because it usually requires the expenditure of the people's money through assessments or a bonded indebtedness; residents of other cities will be interested in San Diego's recent experience in selling construction of Lindbergh Field, a "Triple A" airport. It was not an overnight campaign. The same intensive campaign probably will be the experience in most other communities. Usually more than one city is requested by various outside groups, thus there are those who object to an aerial higher taxation on some general theory which does not seem that San Diego's efforts extended over a period of at least three years. In 1924 the San Diego chamber of commerce recognized the promise and opportunity of commercial aviation and appointed an aviation committee. Even then five men behind toward some terminal facilities for aircraft, although it was not until later that their plans began to take definite shape.

Soon after the committee started active work three years on it was realized that that city must have an adequate airport if it expected to maintain leadership in aviation. A committee composed of Maj. T. C. Munnely, chairman, Col. E. W. Graham, then commanding officer of Rockwell Field, and Capt. S. H. Doyle, then commanding officer of the New Mexico Naval Air Station, was appointed to make a study and survey of possible airport locations. It was determined that an airport in San Diego should be located on flat land suitable in one vast facility for the operation

of both land and airplanes and be as near to the business center as possible. Finally the group decided that the best location to fulfill these requirements was an area at the north end of San Diego Bay on a municipality owned tide lands.

In the meantime John Niles, city planner of Boston, was employed by the city council to draw up a comprehensive city plan and zoning system. As a result of the work of the aviation committee the airport area selected was set aside in a so-called Niles plan adopted by the city council, for municipal zoning activity. From time to time following that effort were made to actually commence work on the airport, but no definite action was taken until September, 1930, when the first draft of the Department of Commerce Air Regulations was issued. Included in these regulations were proposed specifications for municipal airports. In order that the city would be assured of having an adequate municipal airport (and here in the importance of having the same group of men follow through on any such efforts) the same committee which had selected the location was again constituted to study proposed regulations to determine whether San Diego's airport would receive the highest possible rating under these regulations.

What happened? Immediately it was found that the area available on the municipal land would be insufficient to construct an airport in accordance with the air traffic of the future. Immediately adjacent to the municipal land was available a tract of land owned by the United States Marine Corps. It was thought it might be possible to effect some arrangement whereby the Marine Corps property could be made available to the city.

Plan Drawings Made

With this and in view George H. Prentiss, architectural engineer for the chamber of commerce and head of the Prentiss-San Diego Airplane Co., was requested to make a detailed study and draw up specific plans for a "Triple A" airport. Having designed and supervised construction of the Ford Airport in Detroit, Mr. Prentiss stood well into the San Diego air scheme. As the first step in developing plans for the airport, the profile of every street running into the airport was obtained from the city engineer's office. In addition to this the height of all buildings and telephone poles were taken in the area adjacent to the airport apron. Then



Three men of San Diego who rendered valuable assistance in securing the airport bond issue. Left to right: Roy Campbell, Mayor of San Diego; W. H. Gibson, President of the Board of Directors; and Maj. T. C. Munnely, Chairman Aviation Committee, Chamber of Commerce

a chart was developed giving the maximum height of any obstruction within one mile of the airport proper. An arbitrary gliding ratio of 16 to one was determined upon and from this the detailed location of the airport selected. It was decided that San Diego's municipal airport should include a smaller landing field 3,000 ft. in diameter, an angle house for the use of navigators and an adequate communication and servicing area immediately adjacent to these flying areas.

While these matters, guided to a large extent by Roy Campbell, Jr., industrial manager of the chamber of commerce, who had devoted himself to the airport issue in first become a chamber of commerce executive in 1924, were in progress it was found that to build all the necessary additions it would be necessary to locate the landing field almost totally



Present development of area in which Lindbergh Field will be located.

on government property. More study—and it was found this could be done of authority could be obtained from the Secretary of the Navy. During a period of four months plans for Lindbergh Field were presented to various government departments, with the approval of the construction of the 13th Naval District. Each department had, in turn, approved the plans, and actually the committee found that one of the greatest anticipated obstacles had been removed. Following that success the plans, which also involved a change in ballfield and pier land lines, were presented to and approved by the Department of Commerce, the National Aeronautic Association, San Diego chapters, city better committees, only planning commission, members of opinion and the common consent.

Again, the importance of a complete and comprehensive plan may be noted in the fact that the original plans developed for Lindbergh Field were never changed nor modified by any of these organizations and in each case received unanimous endorsement and approval.

But what is this airport to be? A circular area for the use of land planes, 3,000 ft. in diameter, surfaced and drained throughout and equipped with navigation landing and beacon lights. Immediately adjacent to this land plane area a hydro plane designed to a uniform depth of 10 ft. for the use of seaplanes, 3,400 ft. wide and 22,000 ft. long. In addition to the 3,000 ft. hydro plane for land planes a runway leads the direction of the prevailing wind of 7,500 ft. Immediately south of the four acre territory of approximately 125 acres reserved for aircraft manufacturing.

This complete airport is located only 1.5 miles from the

main post office, four minutes by automobile from the business center of San Diego and one mile from the main pier from which shipments of raw materials and supplies to the Pacific seaboard are obtained. The airport is located on one side by the main line of the Santa Fe railway, on the other tracks already extending into the aircraft manufacturing area. Street car and bus service is now in operation within one block of the airport. It is also possible to find an automobile from Lindbergh Field without passing any congested section of the city.

Communication to Secretary of Navy

The corporation after consultation may expect from the naval and military establishment may be added in the following excerpt from a communication sent by Rear Admiral N. McKim, commandant of the 13th district, to the Secretary of the Navy.

"A flying field for the use of civilian, naval and military aircraft, corresponding to the latest plan of the Civilian Chamber of Commerce for a Municipal Airport, is possible at the southeast corner of the Marine Corps base and is situated mostly on the property of the base and partly on private property. This circular field of 3,000 ft. radius is good for the city and it would be a sound idea to build this field in the navy in time of national emergency. It could be maintained jointly by naval and municipal agreement or would be adjacent to any field developed for strictly naval use in front of the Marine barracks. Also, the consequent acquisition of several structures in that portion of the land adjacent to the field would provide valuable facilities which could be commandeered in time of war. The airport facility within the city would be advantageously located in only with respect to the proposed flying field but to the bay area in the north side of the harbor, which, under the plan, would be divided into a minimum of six feet and not a two-foot space for hydroplanes."

After the plan had been fully developed and approved the site cost estimates were obtained that a land oblique site be called to construct Lindbergh Field. It was found that the development of this site would cost about \$2,000,000. A total of \$100,000 was estimated for the construction of the new airport. After this \$100,000 was made the amount needed to be paid completely the flying area with no return of decomposed ground and to provide adequate drainage facilities. As the cost of installing the 26-in. revolving beacon, landing lights and lighting system was \$100,000, it was found that the first cost should include the cost of installing or better 100 x 100 ft. hangar-type building and a set of the following tabulation gives the cost of the work:

Drainage and 21-in. revolving beacon, landing lights and lighting system, 100 x 100 ft. hangar-type building and a set of the following tabulation gives the cost of the work:

Proposed to Call for Bond Election

The common result then was petitioned to call a bond election for \$250,000, to construct the first part of Lindbergh Field. The date finally was set for Nov. 22, 1937 and the National Aeronautic Association was requested to assist in the direction of an educational campaign to present to the public all the advantages of such a field.

Mr. W. Gilman, president of the San Diego chapter of the Association, was named chairman of the committee and collected together some 40 of the leading business men. A list of nearly 80,000 was raised by private subscriptions to defray expenses of the campaign.

For the present airport committee was subdivided into five committees as follows: Finance, speakers, publicity, press

organization and executive committee which was composed of the chairman of each of the sub-committees. At already stated, the fund was approximately \$4,000.

A speaker's manual was prepared for use of the speakers' committee. This gave in detail the type of talks to be made on different points about advantages of the project. Twenty or more public speakers volunteered their services for the campaign. Each of these was given a manual and an instruction was issued certain questions to make sure he was actively familiar with the subject. Each also was furnished a report card to be used in making a report of the work performed that the information might be used by the publicity department. The speaking campaign ran on month practically, prior to the election. Thirty-seven speakers were able to 20,190 people. In addition to this there were some 20,000 calls made by the media.

One of the most interesting features of this speaking campaign was the presentation of a 600 ft. film entitled, "San Diego—Air Capital of the West." This gave a tour of the airport facilities in the city and showed in detail construction of airplanes and procedures and the operation of equipment. The show of the film was devoted to an 85 word question from Col. Charles A. Lindbergh concerning the proposed project. Four prints of this film were shown at four times each day for the week preceding the election. Following each showing a four-minute speech appealing directly



1,000 ft. of 200 planes over San Diego in 1920 that was used effectively in the campaign for an airport.

to an effective role was given. These theatre speeches are thought by the committee to have been one of the most effective means for publicizing the airport.

It was determined that the publicity campaign should be conducted on the week immediately preceding the election. During that week display advertising space was rented in the four daily papers and in all the weekly papers. One

of the interesting features in the fact that airport bonds were issued exclusively by one of the four dailies, by all the 11 weeklies and by the two labor papers. It is believed that in the only case in the history of San Diego which has never the numerous advertisements of the public press.

In addition to the newspaper publicity and advertising, the committee prepared 400 window cards which were placed in downtown store windows, while 2500 windowhead cards were working "Shall Lindbergh Field, More Porch?" and "Let's Build the Spirit of San Diego" were placed in windowheads. At the same time 3000 leaflets had been distributed at various business and service clubs.

A most important phase of the campaign was found to be the studies of an efficient organization to assist in bringing the word to the polls on election day. Experience in San

Diego indicates that bond issues are usually defeated when small votes are lost. The 285 precincts in the city were organized into 15 districts. Each district was provided with a manager on election day and had assigned to him an automobile for each precinct. Each manager was given a complete copy of the Great Register of the precincts in his district. Each precinct worker was issued a copy naming voters in his precinct. On election day the district managers were sent out in their automobiles to become familiar with polling places. At 12:30 p.m. automobiles with drivers were assigned to each precinct so were to be covered by this organization. The effectiveness of this organization may be noted in the fact that the biggest vote in the history of San Diego was cast for the airport bonds! A majority of four in one was cast! And it was the only case of such a large majority on the ballot to carry.

This is hardly the place for eulogy, but a word should be said for Roy Campbell, Jr. It was this young chamber of commerce executive who directed the campaign and directed the planning of the airport. He is credited to having cast a large vote. As a result San Diego will have a "Triple A" airport—and from the better other communities may draw their own conclusions.

Curtiss and Consolidated Send Representatives to South America

RECENTLY THE Curtiss Aeroplane Export Corp. announced that it had increased its capital and was planning to seek additional foreign markets in South America. C. W. Webster, president of the corporation, with Lieut. James Doolittle left for South America a short time ago. They were accompanied by Lieut. Hugh Wade representing the Consolidated Aircraft Corp., Buffalo, N. Y. They will demonstrate planes made by their respective companies to various South American governments. Mr. Webster and Lieut. Doolittle are demonstrating two planes produced by the Curtiss Aeroplane and Motor Co., Garden City, N. Y., of which Mr. Webster is president. Lieut. Wade will demonstrate the Consolidated Hairy PT-5 elementary training plane. It is powered with a Wright Whirlwind motor.

Mr. Webster has been the president of the Curtiss Aeroplane Export Corp. since its formation about six years ago. Lieut. Doolittle is well known in aeronautical circles for his ability as a racing pilot and as a stunt pilot. It will be remembered that he piloted the Curtiss plane that won the Schneider Trophy race in 1930 and later distinguished himself by being the first man to complete an outside loop. Lieut. Wade who won one of the five spots on the team for the World flight by the Army a few years ago. The expedition is expected to take about six months.

War Flier Takes Sales Position With Fairchild Airplane Corp.

JULIAN R. SPEYERS has joined the sales organization of the Fairchild Airplane Manufacturing Corp. of Farmdale, L. I., N. Y. Mr. Speyers is a former war pilot having served with the First Army Squadron, N. Y. National Guard during the Mexican Expedition prior to our entry in the World War.

Before the European war Mr. Speyers was a first lieutenant and commanding officer of the 358 Army Squadron, AEF. For some time prior to joining the Fairchild organization he had been connected with the sales department of the Fairchild Aircraft Corp., manufacturers of Packard planes.

not found. The only limitation in overloading would be in the matter of climb, and even this can actually be made to give slightly better climb in certain instances by providing

Ry 3/2

higher numerical values of the coefficient —
 Kx
 Finally let us quote again from M. G. G. Wilder's comments —

"The production of an aeroplane which is much easier to fly and allows perhaps more and more the errors of judgment to be corrected would have the effect of greatly reducing the circle of errors. Increased safety and confidence would then result from more complete utilization, this being an indirect and long-range effect of making it easier to fly. The young man on the motor-bicycle is running no more risk than the old gentleman who has recently bought a car, statistics might indeed show that the motor-cycle is safer, far although it sells for much more than the car, it does, in general, get more and a tolerable all-around degree of safety is thus obtained in the use of the road."

Hill's Tailless Plane

Hill's Tailless Aeroplane or Pterodactyl was one of the sensations of 1929. It has been extremely described in a number of publications (*). Marco Polo writing in *Flight*, (2) points out that many of its features correspond exactly to the requirements of the competition.

While our readers are no doubt quite familiar with the Pterodactyl, the photograph of Fig. 14, may serve to recall the salient characteristics of this craft, which may be summarized as follows —

(a) A swept back wing, with reduced leading edge and with a 5° washout in incidence to the wing, so as to secure a satisfactory center of pressure.

(b) Controlbars at the wing tips, double cambered and symmetrical in section, acting both as ailerons and elevators.

(c) Reducible in the shape of vertical surfaces, mounted above and below the extremity of the fixed wing and "single wing" that is with the surfaces on one wing only moved over their leading edge to produce yawing moment.

(d) The wing, as an airfoil section, selected by Captain Hill in giving 32 lb. the main characteristics of the Pterodactyl are as follows —

Area of main plane, 222 sq. ft.; wing span, overall 45 ft.; wing span, fixed part of wing only, 30 ft.; area of controlbars, 85 sq. ft.; area of midbars, 14 sq. ft.; weight empty, 480 lb.; stall speed, 220 ft.; stall weight, 650 lb.; maximum speed, 70 m.p.h.; stalling speed, 25 m.p.h.

Captain Hill states the advantages of the craft (and they are thoroughly substantiated by all flight tests) to be as follows —

"Each of the four controls performs its own function and does not interfere with any of the other controls. Variation in speed power has no effect other than an alteration of the rate of climb or glide.

"On turns, both the fore and aft rudder controls are more straightforward and simple in operation than on the normal aeroplane.

"There is no stalling point or marked division between stalled and normal flight, the pilot can 'revolt' without increasing his rate of descent.

"In general, the aeroplane is always under good control up to large incidences in the neighborhood of 45 deg."

The designer also states "The tailless design can be built for a percentage weight smaller than the normal."

There is nothing in the design to indicate that this is so —



En Courvoisier's Data Sheet (Fig. 14) and Hill's Pterodactyl in its use at the 1929 Royal Air Force Display in England

Many a light plane has been built with similar structural or useful load provisions. It seems tempting to get rid of the weight of a long fuselage that there are satisfactory substitutes like up on the wings, overlapping controlbars forming a span beyond control, a third wheel and structure built in place of the conventional tail and, etc. . . . There is a possibility of some structural weight saving, but not a very great one.

From the point of view of aerodynamic efficiency, the tailless curves are good, with a maximum L/D of about 20 for the complete machine but not extraordinarily good. There is no reason why a well streamlined fuselage should not be as fast as less resistance than the stubby nacelle. There is a slight gain apparently in the efficiency of stubbier elevators, but stability produced by swept-back, reflexed, and cambered wings is always more expensive, aerodynamically, than conventional stabilizers.

If we substitute in Dierks' (*) formula for speed range

$$V_{max} = \frac{KV_{min}}{1/V_{min} - W/P}$$

we find $K = 23.4$, which is high but not extraordinary for the aerodynamic efficiency of a lightly loaded machine. The aerodynamic efficiency of a lightly loaded machine is high because the wing area is so large relative to the equivalent parasite area. When the Pterodactyl is loaded at 600 lb. per sq. ft., then in the present design, it is clear that it will have a fuselage greater than a conventional type of similar design. Checking back to the wind tunnel curves

(*) Dierks' Formula for Estimating Airplane Performance and Its Application to Changes in Weight and Wing Area by W. S. Dierks, N.A.S.A. 1934.

we also find that the lift coefficient corresponding to 110 mph the L/D of the model is only 8.

The maximum lift coefficient as tested in the wind tunnel was only 0.0384. Evidently the reduced leading edge and the washout in the tips mean a shoddy loss in lift capacity. The designer of a tailless airplane will find it just as necessary as in design of a more conventional craft to use some device for increasing maximum lift.

For the Pterodactyl, great advantages are claimed for the constant center pressure wing, and the controlbars will certainly avoid the adverse yawing moments of the conventional ailerons.

In 1910 the writer suggested that ailerons might well be in the form of telescopic surfaces, symmetrically double cambered and so connected to the control column as to be in the end of every flight attitude of the plane. The centers of the ailerons or perhaps a combination that the suggestion was a useful one.

In the design of a slot and flap machine, it would seem entirely worth considering fitting restrictions at the ends of the wing and avoiding a great many moments and mechanical difficulties.

Another lesson that we may learn from the Pterodactyl is seen in parasite resistance by the use of the split rudders. Captain Hill was able to glide at 45 deg. incidence by using two rudders on his wings. Had this type of split plane would have had a considerable vertical velocity had it not been for the very light loading.

We believe that in a slot and flap machine, a sufficiently deep slot will be achieved without the use of brines. Never mind the idea of brine-riders in water thinking over. Perhaps a more conventional craft should have two rudders, which can have their leading or trailing edges turned to each other simultaneously. Or a single rudder which can be split in two, or struts pivoting about a vertical axis (as actually used in an Italian motor).

In flight the controlbars rise along the wing at angles of attack between 0 and 30°. Therefore the movement of the



The German Albatross D5A in flight. It is fitted with slots and flaps.

more at pressure is very slight. The controlbars therefore may rise or sink at any time, and whether rising or sinking or sinking or sinking they give a wide margin of control in all flight attitudes. The difficulty is that the moment of pressure and flow is unbalanced, and elevated, the center of pressure and so longer remain constant, the controlbars begin to carry load for time, and the margin of control at high incidence is considerably reduced. It would need a great deal of work to do to produce a wing with slots and flaps, and controlbars without before getting a constant center of pressure with the use of these auxiliary lift producing devices. Without the use of slots and flaps however, we are quite prepared to claim that the controlbars are extraordinarily efficient both in longitudinal and lateral control. The problem placed before the wing are actually improved by the influence of the wing at high incidence. Also their effect over the fuselage

even when turned through a large angle, since the drag becomes effective when the lift decreases.

We are a little dubious as to the dynamical stability available. Captain Hill states that his craft has a satisfactory pitch control, but no roll control, at 40 m.p.h. and the designer seems much or less than ideal. We always prefer a long tail, and a well damped airframe.

On the whole our conclusions would be that with the slots and flaps, the Pterodactyl would lose many of its present advantages, if we were able. There is a more conventional craft could be made to have all its controllability. That certain ideas in its design, are however worth the most careful study.

Conclusions

Our general conclusions may be briefly summarized as follows —

1. There should be no compromise difficulty in designing an airplane that would meet requirements of the competition, though the utmost skill, aerodynamic, structural and mechanical, would be required.

2. In such an airplane some method of increasing the maximum lift of the aerial will have to be provided, and some method of improving the control beyond that provided by conventional control surfaces.

3. There is no doubt that as an airplane meeting the requirements of the competition would be necessary in every way, and possibly a very considerable improvement.

4. There is no reason to believe that there is any special advantage in departing radically from the general form of the existing airplane, and following such a direction as that of Hill's Tailless airplane for example.

5. Finally the competition offers incentive to research in many phases of the art, and so offers to induce progress of the most important character.

Newly Organized Fokker Aircraft Corp. Soon to Begin Production

QUANTITATIVE PRODUCTION of the Fokker Universal planes

and tri-engine types is expected to commence early this spring in the new Fokker plant at Glendale, W. Va., near Wheeling. The newly formed Fokker Aircraft Corp. of America, it is reported, plans for both commercial and government use will be built in the large new plant which is to have more than 100,000 ft. of floor space, and testing will be done on the company's flying field which will extend well beyond the town of Glendale near the Ohio River.

The new corporation is being financed largely by Wheeling and Ohio Valley interests in connection with the New York group which with Anthony Fokker formed the Atlantic Aircraft Corp. in 1924. The latter organization, which up to the present has been the sole manufacturer of Fokker planes in the United States, will be held as a subsidiary of the new concern. The factory at Wheeling Airport, Wheeling, West Virginia, N. J. will be released for experimental construction, service, and repair work.

Mr. Carlisle Spencer of New York is president of the Fokker Aircraft Corp. with which Anthony Fokker will be actively associated as designer and consulting engineer.

F. W. Bellamy Becomes Director of Curtiss Aeroplane and Motor Co.

F. W. BELLAMY, a member of the firm of Dornick & Dornick, has been elected a director of the Curtiss Aeroplane & Motor Co., Inc. Mr. Bellamy's election is for the purpose of giving representation to a large number of holders of stock who are not now represented on the board.

(*) "The Tailless Aeroplane," by G. F. R. Hill, *Aeronautical Journal*, September, 1929.
 (2) "The Pterodactyl Aeroplane," *Flight*, June 21, 1929.

no and rapid final assembly, should be made with rivets or bolts. A flat plate, fastened on a slot in the stamped and most secure attachment, and from such considerations it was determined that slots must be incorporated, either in the structural shape, or in the fittings at the joints. It appeared that weight could be conserved by putting the slot in the structural member between an increase in cross-section area, in which, while a slot in the fitting would result in degradation, and

bars. Formed shapes, made from sheet material do not undergo lasting processes in fabrication, and therefore in process of raw stock manufacture, and, therefore, the material is of a much more reliable and uniform consistency, and is better working condition.

A structural shape, such as the Baraka is readily and satisfactorily inspected at any time during manufacture, and any time after going into service, is contrast with tubes, whose interior surfaces are always an unknown quantity.

A highly important engineering consideration in aircraft structures, especially of light alloys, is corrosion, and particular care is taken by Martin engineers to carefully preserve adaptability to protective coatings wherever structural shapes are being developed. In the case of the shape described above, each channel element is completely and thoroughly waterproofed before being joined to its fellow elements to form the completed member, insuring maximum protection.

Simple and Light Connections Desired

The simplicity and lightness of connections which contribute so materially to the structural efficiency, is likewise a great convenience in the designing engineer, both in the arrangement of primary structure, and of minor beams, brackets, plates, and ready supports for mounting equipment, etc. The adaptability of fundamentally correct shapes is, however, of even greater importance from the viewpoint of maintenance,



At the Martin factory there are machine tools of fine precision for making pipe and fittings for production use.

in many cases complicated. To maintain the essential element of simplicity, the slots were arranged as indicated in Fig. 5, distributed about the longitudinal axis of the member. Providing flat surfaces, through which additional fastenings could be placed, was readily accomplished, as shown in Fig. 5. Having provided this far, it was apparent that maintenance of certain channel elements would necessitate all possible devices. Having obtained the correct basic structural shape, the most efficient proportions and final refinements were gradually evolved by realistic research in the testing laboratory.

The development of structural shapes for members in all parts of the airplane has proceeded along the same line of reasoning.

Reverted to Fundamentals

A great many of the troubles encountered with previous types of construction were eliminated, and came about through inherent development, regardless of thought, of future requirements. By reverting to fundamentals it has been found possible to produce a variety of structural shapes, which are free from inherent faults, and which give excellent promise of further maintenance development. The benefits resulting from such a plan of investigation are typified by the advantage of the Baraka shape described above, over previous types. When it is used in a frame structure, such as a fuselage, the frame-work is naturally lighter than tubing, either steel or aluminum alloy. An important difference is in the weight of fittings and attachments. In the specific case of a 3500 lb. airplane, the weight of the uncovered fuselage structure was 28 per cent. lighter than a structure of the same dimensions made of alloy steel tubing.

There is an advantage in the strength of joints or connections.



The long test trailing furnace at the Martin factory. It is fitted with electrically recording potentiometers.

repair, and alterations desired during the service life of the airplane. It vitally concerns the effectiveness of planes in war, and the cost of commercial operations.

Closely interwoven with purely technical considerations are many important requirements for economical construction. The ongoing struggle for efficiency of production has already focused the lines of thought which must be followed. Briefly the new materials must be available in ample quantities at moderate cost. Structural details must be readily adaptable

Pratt and Whitney Engines In Boeing Mail Service

Wasp Engines Used in Boeing Mail Planes on Chicago-San Francisco Route

BOEING AIR Transport, Inc., of Seattle, Wash., completed on Dec. 31, 1927, the first six months of its operation of trans-continental air mail from Chicago, Ill., to San Francisco, Calif. Operation began last July using 26 specially built Boeing mail planes powered with Pratt & Whitney Wasp engines and during this six months of service, over perhaps the roughest stretch of any airway in the world, the engines and planes have stood up remarkably well.

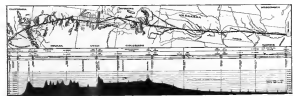
In this period there were only five mechanical engine failures all of which were absolutely minor in nature. While they resulted in delays, there was no damage to the planes, passengers or pilots, and only slight damage to the engine, so that almost within a few hours all were again in service. This is a record of 999,000 m.-of different commercial flying in the hands of a number of different pilots.

When operating over the route the planes and engines are subjected to wide variations of flying conditions. The planes are operated at altitudes from sea level to approximately 4,000 ft. over flat prairie and over mountains that sometimes force the planes as high as 35,000 ft. Ground temperatures vary from 45 deg. in winter to as high as 120 deg. in summer



A Wasp engine Boeing mail plane of the type on the Chicago to San Francisco air mail route.

in 180 mi. of Sacramento, the plane must clear a maximum altitude of 5,000 ft. which is the summit of the peak in the Sierra Nevada Mountains. If this peak is obscured by clouds, as is often the case, it is necessary to ascend to an altitude of 12,000 ft., or even 35,000 ft., to be certain of clearing the peaks of the range. On the other side of the range, the airplane drops into Reno, Nev., at an altitude of 4,000 ft. The next stop is Elko, Nev., at an altitude of 5,000 ft. Between these two places are ranges of mountains with maximum elevations of 8,000 to 10,000 ft., although, by following the passes, an altitude of 7,000 to 8,000 ft. is safe for flying. East from Elko, there are four ranges, after which the line crosses Salt Lake Desert and enters Salt Lake City at an elevation of 4,100 ft. Into



Profile and map of the air mail route between Chicago and San Francisco. Within 200 mi. of Sacramento, Calif., the air mail plane must clear a maximum altitude of 5,000 ft. and taking off at an altitude of 4,000 ft. at Cheyenne, Wyo., it must reach 12,000 ft. within 40 mi.

(Continued on page 324)

Both Lake City come also two Foster Ears, the Western Air Express from Los Angeles and the Vancay line from Paso, Wash., serving the Northwest.

"Out of Salt Lake City the load is almost the heaviest on the entire line. The load carried outward out of Cheyenne usually is a few pounds heavier. Taking off at an altitude of 4,000 ft., the plane must attain an altitude of 16,000 ft. in a distance of about 40 mi. to clear the Wasatch Range. The next stop, at Rock Springs, Wyo., is at an altitude of 6,000 ft. and is the highest regular stop. The emergency field at Rawlins, Wyo., is higher, having an elevation of approximately 8,000 ft. Leaving Rock Springs, it is necessary to fly at about 7,000 or 8,000 ft. and within 200 mi. of Cheyenne, Wyo. When it is necessary to fly to 12,000 ft. to clear the Laramie Mountains at Sherman Pass, Cheyenne lies at an altitude of 6,200 ft. From Cheyenne outward, the route is over country that is substantially flat, the elevation decreasing to 2,800 ft. at North Platte, Neb., 1,500 ft. at Omaha, 600 ft. at Iowa City, and 600 ft. at Chicago."

This is part of the transcontinental system and represents about one-third of the total distance from New York to San Francisco. The accompanying illustration strikingly indicates the character of the country over which this flight is made, both ways daily. It is pointed out that the road plane leaves Chicago at 7:00 in the evening and flies through the night across Illinois and Iowa, arriving at Omaha, Neb., at 4:30 the following morning; then across Nebraska and Wyoming, arriving at Salt Lake City, Utah, at 10:00 A.M. The last leg in the journey crosses Utah and Nevada, the plane arriving in San Francisco at 4:00 P.M.

28 Warp Engines Used

The planes used over the route are Boeing mail planes, which were described in detail in the July 4, 1927 issue of AVIATION, are conventional designs with wood wings and steel fuselage covered with fabric. For the 24 planes which were put into service 28 engines were used, four of which were extra in period of overhaul and not in operation. The Warp engine is called a 500 hp. type though the Navy rates it at 450 hp. at 1,500 r.p.m. using domestic aviation gasoline. To the engineer it is of interest that this

rating corresponds to a mean effective pressure of 132 lb. per sq. in. During the first three months of 1927 the mail loads increased to such an extent that the engines on the Western Division operated at about 55 per cent. of full throttle at all times.

Certain engines approached 300 hr. in the difficult service before overhauling. It may be stated here that inspection or overhaul of engines was intended to begin at 200 to 300 hr., at that all engines might require some attention before the last ones to be loaded had reached the point of exceeding 300 hr. Experience to date indicates that the average Warp engine in difficult service should reach 300 hr. with only minor inspection and adjustment. At this point a top overhaul and complete inspection is advisable. It is an interesting fact that some of the engines are now approaching the period of 200 additional hours of operation following their first inspection or overhaul.

Improvements on the Engines

Of the total of five mechanical failures, two were the oil pump shaft, one a case and two breakage of mixer parts in the valve gear. It is fair to point out that in addition to the above there were four instances of control systems. These are not classed as mechanical failures as they were clearly caused by lack of engine temperature control, two instances occurring in the very early summer, two in the first severely cold winter weather. Temperature control and operation during the extremely cold weather is now well in hand through the employment of cooling with shutoff control and the addition of the new Pratt and Whitney hot spot heater for the induction system.

A summary of the six months' operation from July 1, 1927, to Dec. 31, 1927, follows the following interesting statistics:

Total engine hours	\$11,256
Total hours down	8,293
Total pounds mail load	296,372
Total pounds express load	8,200
Total passenger miles	365,727

(Continued on page 337)



A Boeing mail plane powered with a Pratt and Whitney Warp engine. Twenty-four planes of this type were built for service between San Francisco and Chicago.

The "Command-Aire"

A Three Place Open Cockpit Biplane Now Being Produced by the Arkansas Aircraft Company

ARKANSAS AIRCRAFT Co. of Little Rock, Ark., has announced that it is in quantity production on the first model of a series of different type planes to be built during 1932. The trade name of all the planes produced by the company will be "Command-Aire". Albert Voelckmann, formerly with the Ernst Heinkel Airplane Works, Wernau, Germany, and now chief engineer for the Arkansas Aircraft Co., is the designer of this series of planes.

The first model (Type 3C-3) is a three place open cockpit biplane powered with a Curtiss GX-3, though engines of higher power may be used. The Command-Aire has the appearance of having a very long fuselage as the cowl from the top of the radiator, which is in front of the engine, is continued back to the tail intercepted only by the openings for the two cockpits. The wing structure is of the single bay design with the outer section struts spreading outward. As there are no wires or members coming along the fuselage the pilot has unobstructed vision forward. This strut arrangement consists of the usual N struts supporting an exceptionally wide center section, with the N strut reinforced by an aluminum member or compression strut from the top wing fitting to the landing gear support at the bottom of the fuselage. Streamline wire bracing is used across the bay while there is nothing between the outer section supports. The outward interplane struts are of the usual N type. This manner of bracing with steel wire and square radiator top gives the plane the appearance of very sturdy construction.

Landing Gear Has 7 Ft. 3 In. Travel

The landing gear, which has a forty five pound load, tends to assume this appearance of sturdy construction. According to the manufacturer the landing gear is designed to absorb at least 50 per cent. of the original shock instead of part of the load being carried to the fuselage. The landing

gear is of the divided axle type with a single shock absorber and having rubber shock in tension between the outer members. The fuselage is quite long and with a track of 7 ft. 3 in. between the wheels there is little tendency to ground loop.

Fuselage Has Straight Sections

The fuselage, like the rest of the plane, is built up of many straight sections meeting itself to efficient production. According to the designer the fuselage design is very efficient reducing the resistance to a minimum. It is claimed that the fuselage is so shaped that the propeller streamlines slings to the fuselage increasing the efficiency of the tail surfaces. The frame of the fuselage is of aluminum alloy-tubular steel being welded in place with an wire bracing. A fire wall consisting of a layer of asbestos between two sheets of aluminum separates the engine from the cockpit. The cowls are very roomy though they are very close to the fuselage to effect the external shape of the fuselage. Both cockpits are furnished with high grade upholstery material to match the external finish of the plane. The floor is of reinforced aluminum and is deepened. The seat in the rear cockpit is very wide, extending the entire width of the fuselage, giving the pilot considerable freedom. This is extremely useful when making long flights. A locker for light tools and clothing is provided. The instrument panel is mounted on a steel tube bracing that prevents the instruments from vibrating and also serves as a substantial base for the top cowling between the two cockpits. The wings are of conventional design, both being of the same overall span with unsymmetrical tips. The ailerons are of mixed type set in an appreciable distance from the tip. Unlike the wing the ailerons are of metal having a welded

(Continued on page 336)



The Arkansas Aircraft Co. Command-Aire powered with a Curtiss GX-3 engine.

MANUFACTURERS' SPECIFICATIONS ON AMERICAN COMMERCIAL

THE TABLE BELOW IS BELIEVED TO BE ACCURATE BUT AVIATION

[illegible]

NOTE: All are half plates unless noted otherwise.

WATER	Flow	engine	valves
1000-1500	10-15	10-15	10-15
1500-2000	15-20	15-20	15-20
2000-2500	20-25	20-25	20-25
2500-3000	25-30	25-30	25-30
3000-3500	30-35	30-35	30-35
3500-4000	35-40	35-40	35-40
4000-4500	40-45	40-45	40-45
4500-5000	45-50	45-50	45-50
5000-5500	50-55	50-55	50-55
5500-6000	55-60	55-60	55-60
6000-6500	60-65	60-65	60-65
6500-7000	65-70	65-70	65-70
7000-7500	70-75	70-75	70-75
7500-8000	75-80	75-80	75-80
8000-8500	80-85	80-85	80-85
8500-9000	85-90	85-90	85-90
9000-9500	90-95	90-95	90-95
9500-10000	95-100	95-100	95-100

PROFESSOR
 Dr. William
 Dr. Marshall
 Dr. Richard
 Dr. Thomas
 Dr. Henry
 Dr. William
 Dr. John
 Dr. David

This table will appear multiple times. Explanations and assumptions are listed

BIRPLANE AND SEAPLANES AS COMPILED BY AVIATION

DO NOT ASSUME RESPONSIBILITY FOR THE FIGURES GIVEN

[illegible]

FUELLAGE AND WIND LOSS

KEY:
W—Wetland
B—Barren
G—Grass
M—Mud
C—Cyanobacteria

FRAGMENTS:
F—Fragments
P—Palaeozoic

LITERATURE

CHEMICALS:

- (1) — 6 valves
- (2) — 7 valves
- (3) — 8 valves
- (4) — 9 valves
- (5) — 10 valves
- (6) — 11 valves
- (7) — 12 valves

STRENGTH AND STIFFNESS

DECLARATION OF INTEREST

1940-1941

TYPE (GROUP) _____
App: _____

TEPE (TEPEP) 1000
Anti-doped for acid in water

The Richmond "Sea-Hawk"

A Five Place Monoplane Flying Boat Powered With Curtiss K-6 Engine
And Built by the Richmond Airways, Inc.

RICHMOND AIRWAYS, Inc., of Greenvillage, Staten Island, N. Y., recently completed their latest product, a packer flying boat powered with a Curtiss K-6 engine. Richmond Airways "Sea-Hawk" is a five passenger open cockpit monoplane with the engine mounted where the wing. The pilot and passengers sit in the hull. The plane is of quite conventional design with the wings surface, wood and fuselage hull and tail cone covered with wangs externally bound. The most radical features of the plane are the dual rudders and vertical fin, mounted below the stabilizer in the diagram.



The "Sea-Hawk" aloft during the trial flights at Fresh Kill Creek, Staten Island, N. Y.

The Richmond Airways "Sea-Hawk" is a five place open cockpit monoplane with pilot and passengers sitting in the hull. There are two cockpits, the forward one being fitted with dual, side by side control and the rear one with a seat wide enough for three passengers. The hull has a V bottom with two steps, wooden frame with fibroclite sides and deck. The bottom is of aluminum, fastened to the frame with wood screws. The general outline of the hull shows good streamlining from making it seaworthy and acceptable on the surface.

In the front of the forward cockpit at the very nose of the hull is fitted the anemometer and any other equipment. The forward cockpit is provided with conveniently independent control with the entire mechanism behind the instrument board.



The "Sea-Hawk" on the runway of the Richmond Airways, Greenvillage, Staten Island, N. Y. Note the dual rudders.

The rubber pedals are of a strap type with cables attached and passing over aluminum pulleys to the push and pull end of the rudders. The horizontal stabilizer is adjustable in flight by a sprocket and chain in the cockpit and another in the empennage. The engine controls are operated by cables. The rear cockpit is quite large with ample room below the passenger seats for baggage. In back of the rear cockpit in the hull, just before the engine there is located a mass fuel tank of 52 gal. on the center of gravity. The tank has a pressure feed to the engine above it.

The wings are of wood, covered with fabric on the wood struts. It is of the semi-monoklar type with box spars having two ply mahogany veneer flanges covered and glued to the ribs. The box spars are fitted with laminas in a conventional manner at the fittings. The ribs are of Warrina tube construction with tubular rivet fastenings to the ribs. The ribs are spaced 16 in. apart. The ribs are built up with three ply spruce wing strips. The trailing edge is covered with three ply mahogany veneer, while the leading edge is of wire. Conventional heavy wire is used for the diagonal bracing to take the drag loads. All of the fittings are built up of welded flat steel and having high strength fasteners. The covering is flighted, finished with six coats of T-Two dope. The trailing edge of the wing is perforated at intervals to

allow air to pass through the wing. The landing gear is of the semi-monoklar type with box spars having two ply mahogany veneer flanges covered and glued to the ribs. The box spars are fitted with laminas in a conventional manner at the fittings. The ribs are of Warrina tube construction with tubular rivet fastenings to the ribs. The ribs are spaced 16 in. apart. The ribs are built up with three ply spruce wing strips. The trailing edge is covered with three ply mahogany veneer, while the leading edge is of wire. Conventional heavy wire is used for the diagonal bracing to take the drag loads. All of the fittings are built up of welded flat steel and having high strength fasteners. The covering is flighted, finished with six coats of T-Two dope. The trailing edge of the wing is perforated at intervals to

Fokker adopts AIRCRAFT BERRYLOID



FINDING that no other material could protect and beautify Fokker Aircraft as well as Aircraft Berryloid, the officials of the Atlantic Aircraft Corporation have adopted this high luster lacquer as their standard finish. Roma Brown and Black Aircraft Berryloid feature the new "Super" Universal recently announced by this concern.

This selection of Berryloid as standard is distinctly in line with the insistence of purchasers of high grade airplanes that the finish must possess beauty and durability. For this reason leading builders of commercial aircraft have unanimously adopted Aircraft Berryloid as the one finish that perfectly fulfills these requirements.

"Specifications for Aircraft Finishing", a booklet now in its second edition, will be of great help to you. It is yours for the asking.



Member
National Chamber
of Commerce

BERRY BROTHERS
Varnishes Enamels and Lacquers
Detroit, Michigan 1858-70th Anniversary-1928 Williamsport, Pa.

Manufacturers
of Progressive
Aircraft Finishes

draw any water that may be absorbed. The natural bending is of streamlined, laminated spruce standards, 2½ in. wide by 7½ in. thick. They are 11 ft. long and supported in the hull by quarter inch rods running athwartship.

The engine harness and supports are of streamlined, laminated spruce and are formed in the form of an S, and were broad, simulating the ordinary American aircraft. The engine is mounted above the wing with the propeller at the

centerline and passenger flights. The boat was designed by George H. Schatz, working in conjunction with the Richmond Airways, Inc., of which he is president, and the following staff: L. B. Van de Hyden, vice-president and treasurer, A. B. Kohlen, secretary and manager.

Odenbreit Engine Shows Smooth Operation in Preliminary Tests

PRELIMINARY TESTS of the new Odenbreit engine, mounted in a Thrush-like biplane and flown from the American Airways Field, Los Angeles, Calif., have shown a smoothness of operation at all speeds and under all conditions that it claimed to be surpassed by any commercial engine now on the market. This engine will soon be in quantity production and will sell at the comparatively low price of \$1,000.

Although final tests have not yet been made on the maximum power, fuel consumption, and r.p.m. this engine may be expected to deliver when mounted in the standard three place commercial plane, the tests thus far have shown that it will turn up 1800 r.p.m. in the air, has a maximum horsepower of around 160, will turn better than 120 m.p.h. with the Thrush-like, and with it all has no other lack of vibration.

The engine is a seven cylinder radial of seven or less conventional design. It has a divided crankcase, master rod, two piece crankshaft, all accessories, tappet rods and flow pipes located below the engine, and steel cylinders with aluminum fins.

New Western Coast Corporation Produces Seven Place Biplane

ORIGINAL IN design, the Best-Couch is the first plane to be produced by the G. W. Young Airplane Corp. of Glendale, Calif. This plane is a seven place, dual control, open biplane with welded steel tube fuselage and conventional wood wings. Five passengers are comfortably seated in the cabin which is so constructed that the rear half of the cabin roof may be removed at will, giving either a sunbathing place or a completely enclosed cabin. The two pilots are seated side by side, forward and considerably higher than the other, separate controls being provided for each pilot.

This plane is being built in order for a local gun club and has been designed especially for high altitude work, landing and taking off from small fields among the mountains of the coast range, taking the club members to out of the way hunting grounds, and providing a large covered capacity for normal work.

The speed of both wings is 45 ft., wing area is 500 sq. ft., plane is equipped with a Western converted, Superpower-Delaware radial engine and will burn, fully loaded, a amazing volume of about 4½ hr.

Mr. Young has designed an experimental twin engine monoplane that shows great promise. It has been used several times by Prof. A. A. Merrill, at the University of California, and according to the figures it will show great performance as an air engine with full load. Mr. Young is not ready to give out details of this plane as yet but will have it under construction within thirty days.

The G. W. Young Airplane Corp., Glendale, Calif., is now engaged in building engine built airplane for private and commercial use. The company was founded by Otto Young and has been financed by him so far. The officers are G. A. Dawson, former sailing engineer, Pres., and O. W. Young, Vice Pres.

Trial Flights Made in Fairchild Plane Built for Duration Attempt

STUNNING TRIAL flights were made late in January in the new Fairchild-Chandler seven monoplane which is to be used in an attempt to better the world's flight duration record which went to Germany when Correllus Edmund and Johnnie Rector remained in the air for 52 hr. 20 min. last August. The new attempt will be one of many being made in this country to bring the record back to the United States.

Called the "seaplane plane" because the office of the Fairchild Aviation Corp. here rented its building and flight in seaplane, the new seaplane monoplane will stay aloft for 60 hr., if the hopes of its makers achieve actuality. The plane is equipped with the new General four cylinder 125 hp. engine which is claimed to have a low fuel consumption which makes possible a flight of greater duration.

According to reports the plane when loaded will weigh 4,000 lb., weighing 2,000 lb. empty. The gasoline, of which 300 gal. will be carried, will be neatly stored in special wing



The Fairchild-Chandler seven monoplane engine on its trial flight at Curtiss Field, E. S. M. T.

tanks each of 150 gal. capacity, while the remaining 50 gal. will be kept in a cabin tank. Twenty gal. of oil will run for the lubrication.

Lengthened for the endurance flight, the wing spread is 56 ft. with an area of 350 sq. ft. in lifting surface. The wings of the plane are of the folding type.

Appoint Wilkes Aero & Transfer Co. American Eagle Distributor

WILKES AERO and Transfer Co., Inc., of North Wilkesboro, N. C., has been appointed distributor for the American Eagle Airplane Co. in North and South Carolina. The president of the company is A. B. Benson.

The AIRSEDAN



Safety

Built under Department of Commerce Certificate of Airworthiness No. 12. Approved for 10000 lbs. pay load.

INSURANCE

Full coverage will be granted for all passengers, because they cannot interfere with the controls.

SPECIFICATIONS

Seating Capacity	pilot and 4 pass
Weight Empty	1000 lbs.
Wing Area	330 sq. ft.
Span	42 ft.
High Speed (sea level)	120 M.P.H.
Engines	Weight Warhead

EQUIPMENT

Self Starter, Metal Propeller, Compass, Air Speed Indicator, Horizontal Light, Tachometer, Altimeter, Clock, Fuel Exhaustor, Fuel, Oil Pressure and Oil Temperature Gauge, Air Corps Theodolite, Strainer, and Fuel Valve, Exhaust Manifold with Muffler and Chain Hoist, Metal Mail or Baggage Compartment.

The Ideal Commercial Plane

Price \$12,500 Flyaway
Completely equipped

BUHL AIRCRAFT CO.

Marysville, Michigan

rear wing as a pusher. The wing tip floats are of the V type. They are of duralumin, manufactured by Edo Aircraft Corp.

The empennage has two vertical stabilizers and two vertical rudders. The two rudders are interconnected with a push and pull tube. The rudders and vertical stabilizers are connected to the horizontal stabilizers. Vertical stabilizers are connected to the horizontal stabilizers. The stabilizers are 42 in. apart. The elevator is operated by push and pull tube. The entire empennage is well above the dock away from the water and in the full slipstream.

One model of the type, the Sea-Duck, is now complete and is now mounted by George H. Schatz, president of the Richmond Airways, Inc., at French Hill Creek, Staten Island, N. Y. The plane shows remarkable maneuverability on the water and by glancing the engine back over rudder, the Sea-Duck practically turned in its own length. In the air the plane performs very well being completely stable.

The characteristics of the Richmond Airways' Sea-Duck as supplied by the manufacturer are as follows:

Length overall 31 ft. 6 in. Wing span 44 ft. 6 in. Wing area 332 sq. ft. Wing loading 115 lb. per sq. ft. Empty weight 1,000 lb. Gross weight 2,000 lb. Max. speed 120 m.p.h. High speed 100 m.p.h. Low speed 60 m.p.h. Cruising range 1,000 miles

The first use of these flying boats will be realized for de-

To Hold All-American Aircraft Show in Detroit April 14 to 21

DETROIT, MICH., has been selected for the national aeronautical exhibition this season to be held April 14 to 21, inclusive, and to be known as the All-American Aircraft Show. It will be conducted by the Detroit Board of Commerce in cooperation with the Associated Chamber of Commerce and that the show will be one of the best has already been indicated, according to Maurice Ray Cooper, state director of fairs, who has received very favorable endorsing exhibition upon receiving from Frank W. Blair of chairman of the Aircraft Events Committee and William B. Mayo of the Ford Motor Co. as chairman of the Show Committee.

No charge shall be made for first space in exhibition of aircraft, it is stated in a recent bulletin of the department of fairs, and only a nominal charge of \$50 per foot shall be made for the exhibition of engines, accessories, parts, supplies, etc. There will be 100,000 sq. ft. of floor space.

Leslie "Smoking Jack" Harshbarger, U. S. Army second-the-world flier of 1924 now connected with the chamber, has been appointed to represent the industry. He will actively participate as a member of the important show committee, and he has announced that he will assist Mr. Cooper in Detroit.

All manufacturers of airplanes and engine appliances are eligible to exhibit their products whether they are members of the Associated Chamber of Commerce or not, it has been here announced. The Ford Motor Co. recently stated that the Dearborn Airport will be available to exhibitors and visiting aircraft at all times and that utilization of the field for demonstrating purposes will be welcomed.

Buses and exhibition application blanks have been mailed, and Mr. Cooper expects all of the floor space to be quickly reserved. Applications are to be made about March 1.

In preparation for the show, Chairman Frank W. Blair of the Aircraft Events Committee has appointed a show committee consisting of William B. Mayo, chairman, William E. Metzger, vice chairman, Harry G. Graham, Thomas S. Merrill, Carl E. Keller and Capt. L. H. Workman. William E. Stord has been named chairman of a committee on program and entertainment.

Manufacture of Air-Cat Engine is Planned by Cincinnati Interests

ANOTHER LEAP in air has been promised the Detroit Air-Cat engine. This comes with an announcement that the R. R. Leffland interests, connected with the machine and tool company of that name in Cincinnati, are preparing to manufacture the engine in two series of three each, according to reports from Cincinnati, O.

Oliver D. Angle and Robert Williams, formerly of the Detroit Aircraft Engine Corp. which introduced the Air-Cat, are in Cincinnati, and it is said that the Leffland interests are planning to purchase the assets of the Detroit firm.

The plan calls for six engines. In the first series there will be a three-cylinder engine developing 50 hp., a five-cylinder developing 70 hp., and a seven-cylinder developing 90 hp. In the second series, the five-cylinder engines will develop 110 hp., the seven-cylinder, 130 hp., and the nine-cylinder 160 hp. Such a range of power in an engine is calculated to cover a wide field of aircraft needs.

Production of the Air-Cat, it is said, will begin in about three months with a working force of between 100 and 150 men employed. Whether manufacture will be a division of the Leffland company or by a separate corporation has not yet been announced.

February 6, 1928

Heath Airplane Co. to Distribute Lincoln-Page Planes in Illinois

DISTRIBUTIONSHIP OF the Lincoln-Page airplane in Illinois and also portions of Indiana and Wisconsin has been granted to the Heath Airplane Co. of Chicago, according to a recent report from the Lincoln Aircraft Co., Lincoln, Neb. A description of the Lincoln-Page, which is a three place open cockpit biplane, was published in AVIATION, Oct. 26, 1927. It is understood that the Heath Airplane Co. will endeavor to promote the Heath-Poland monoplane biplane carrying on the distribution of the Lincoln-Page.

Cameron Seven Cylinder Engine is Now on Display in New York City

THE NEW Cameron airplane engine, a product of the National Aero Corp., designed by Everett S. Cameron, is now on display at the company's showrooms, 306 E. 43 st., New York City. This is the first of three engines which the company plans to put in production.

Several features are noteworthy in this new engine. It is a seven cylinder, radial air cooled of conventional type designed to develop 100 hp. at 1600 rpm. Bomber power curves are not available at this time. Dual valves are used and operating in a chamber directly above the cylinder head easily opens and closes. In this construction the incoming gases are heated by coming in direct contact with the cylinder head and in a reverse manner the exhaust valves are cooled by the incoming mixture. In addition to this there are a number of cooling fins directly on top of the cylinder head. A new type of valve operating mechanism is used; it is by means of offsetting valve stems, which are designed to give the valves a more direct push.

The ignition cables run through metal guides protecting them from wear and giving the engine a very clean-out appearance.

The Cameron engine is of a high compression type with a ratio of about 6 to 1. The weight of the engine is about 280 lb. It is claimed that this engine has high thermal efficiency and is very adaptable to production on a large scale. The price is quoted at \$2,500.00 f.o.b. factory, and will be ready for the market in the near future.

Corporation is Formed in Oregon To Produce the Davis Cabin Plane

SIX AND eight place cabin type monoplane are now to be manufactured in Portland, Ore., by the Davis-Laingman Aircraft Corp., it is reported. Incorporation articles of the company calling for a capital stock of \$250,000 were recently filed at Salem, Ore., by Ray J. Davis, James D. Laingman, and J. D. Gorman.

The Davis monoplane, it is understood, are to be used for heavy commercial work. Alloy steel tubing is used throughout the entire fuselage, with spruce and Douglas fir employed in the wing construction alone. One of the planes is now used by the Laingman Electric Corp., while another has been in the Brookline Aircraft factory since the same time.

The present assembling plant is small, but with five orders for planes a greater output is contemplated. By March the company plans to employ a force of 50 or 60 men and manufacture two monoplane a week.

Ray J. Davis, president of the Davis-Laingman Aircraft Corp., has been in the aeronautical field since 1909 at which time he was a student at Curtiss Field, San Diego, Calif. He was also with Lincoln-Bessie at one time in the capacity of mechanic.



EVER SINCE 1906, The Cleveland Pneumatic Tool Company, manufacturers of Aerial Shock Absorbing Struts, has been testing and applying compressed-air-controlled devices. The success of the Great Air Spring and our recent acquisition and improvement of the Westinghouse Air Spring, has made us the foremost manufacturer of pneumatic shock absorbers.

When aviation demanded a shock-absorbing landing gear, it was not necessary for us to experiment, but merely develop and apply the principles we had been successfully applying for 25 years.

But even then Aerial Shock Absorbing Struts were not placed upon the market until they had been exhaustively tested and proven on our own plane.

Today there is a set of proven facts on these struts. (1) They absorb, without rebound, shock loads equal to more than twice the weight of the plane. (2) They enable you to taxi smoothly regardless of the condition of the ground. (3) They make forced landings less hazardous. (4) They protect and prolong the life of the plane.

We will gladly send descriptive literature to any interested party.

CLEVELAND PNEUMATIC TOOL CO.
3737 E. 78th St., Cleveland, Ohio



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U. S. Navy Surplus, Lined with Persian Angora

We have just purchased a small lot of these suits and offer them to you at a very low price.

Don't miss this opportunity to get the best bargain yet offered in high grade winter flying clothing. These suits are made of water-proof cloth and lined with Persian Angora Mohair, which makes them comfortable, warm and durable.

Feature quick fasteners, high collar and comes in your complete with wooden neck-sticks and helmet.

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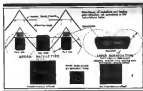
Address —



ABOUT LIFT

The Martin "Eureka" Section

(Continued from Page 323)



to accurate reproduction in great quantities by ordinary labor, and all details must flow in a smooth, steady stream to a rapid and accurate final assembly. There must, above all, be no interruption in the rapidly moving final assembly process. It may be readily seen that individual structural shapes which are adapted in simple attachment and disassembly fulfill another important requirement for successful quantity production. The details can be made in large quantities in small floor space, with great accuracy and completely prepared for rapid assembly. Simple quantities can be efficiently stored



Bulk section and other shapes formed in the 54 ft bending bridge after heat treatment at the Glenn L. Martin factory.

to insure uninterupted final assembly, or to fill inadequate space parts requirements, without involving time, labor and floor-space required to make and store major parts.

Although this re-arranging of aircraft construction was undertaken four years ago primarily as an engineering problem, it has had a profound effect not only upon production technique and methods, but, far more important, upon the whole production policy.

Therefore the constant shifting of construction types has involved development of productive capacity, and created a constant rearrangement of tools and labor, and floor space.

The universal application of structural members designed from fundamental and made from basically correct material places production plans at last upon a firm foundation. For the first time in the history of aircraft it is possible to adopt permanent machinery for large scale manufacturing—machinery whose universal capabilities match the wide-spread application of the forms it produces.

Beginning from this firm foundation a permanent plan of mass production is being built up, based on the sound principles of manufacturing, incorporating everything necessary to produce accurate application and great capacity per unit floor space for producing detail parts, and leading finally to the lift stream of the final assembly.

The Martin production organization is not satisfied, however, to stop with the "first law" machinery and tools which are directly associated with fabrication of parts. There is already in operation a "second law" of machine tools that do not make airplane parts. These machines have precision die forged ordinary tool room machinery, and they are used only to make jigs and fixtures for production use, and stand as a symbol of the future when tool-making by hand will be inadequate.

Pratt and Whitney Engines In Boeing Mail Planes

(Continued from page 324)

Of particular interest from the engine standpoint is the following table representing engine performance through this period:

Engine Data	Pratt & Whitney		Boeing Data		Boeing Data
	Model	Power	Model	Power	
Boeing No. 1	100	100	100	100	100
Boeing No. 2	100	100	100	100	100
Boeing No. 3	100	100	100	100	100
Boeing No. 4	100	100	100	100	100
Boeing No. 5	100	100	100	100	100
Boeing No. 6	100	100	100	100	100
Boeing No. 7	100	100	100	100	100
Boeing No. 8	100	100	100	100	100
Boeing No. 9	100	100	100	100	100
Boeing No. 10	100	100	100	100	100
Boeing No. 11	100	100	100	100	100
Boeing No. 12	100	100	100	100	100
Boeing No. 13	100	100	100	100	100
Boeing No. 14	100	100	100	100	100
Boeing No. 15	100	100	100	100	100
Boeing No. 16	100	100	100	100	100
Boeing No. 17	100	100	100	100	100
Boeing No. 18	100	100	100	100	100
Boeing No. 19	100	100	100	100	100
Boeing No. 20	100	100	100	100	100
Boeing No. 21	100	100	100	100	100
Boeing No. 22	100	100	100	100	100
Boeing No. 23	100	100	100	100	100
Boeing No. 24	100	100	100	100	100
Boeing No. 25	100	100	100	100	100
Boeing No. 26	100	100	100	100	100
Boeing No. 27	100	100	100	100	100
Boeing No. 28	100	100	100	100	100
Boeing No. 29	100	100	100	100	100
Boeing No. 30	100	100	100	100	100
Boeing No. 31	100	100	100	100	100
Boeing No. 32	100	100	100	100	100
Boeing No. 33	100	100	100	100	100
Boeing No. 34	100	100	100	100	100
Boeing No. 35	100	100	100	100	100
Boeing No. 36	100	100	100	100	100
Boeing No. 37	100	100	100	100	100
Boeing No. 38	100	100	100	100	100
Boeing No. 39	100	100	100	100	100
Boeing No. 40	100	100	100	100	100
Boeing No. 41	100	100	100	100	100
Boeing No. 42	100	100	100	100	100
Boeing No. 43	100	100	100	100	100
Boeing No. 44	100	100	100	100	100
Boeing No. 45	100	100	100	100	100
Boeing No. 46	100	100	100	100	100
Boeing No. 47	100	100	100	100	100
Boeing No. 48	100	100	100	100	100
Boeing No. 49	100	100	100	100	100
Boeing No. 50	100	100	100	100	100
Boeing No. 51	100	100	100	100	100
Boeing No. 52	100	100	100	100	100
Boeing No. 53	100	100	100	100	100
Boeing No. 54	100	100	100	100	100
Boeing No. 55	100	100	100	100	100
Boeing No. 56	100	100	100	100	100
Boeing No. 57	100	100	100	100	100
Boeing No. 58	100	100	100	100	100
Boeing No. 59	100	100	100	100	100
Boeing No. 60	100	100	100	100	100
Boeing No. 61	100	100	100	100	100
Boeing No. 62	100	100	100	100	100
Boeing No. 63	100	100	100	100	100
Boeing No. 64	100	100	100	100	100
Boeing No. 65	100	100	100	100	100
Boeing No. 66	100	100	100	100	100
Boeing No. 67	100	100	100	100	100
Boeing No. 68	100	100	100	100	100
Boeing No. 69	100	100	100	100	100
Boeing No. 70	100	100	100	100	100
Boeing No. 71	100	100	100	100	100
Boeing No. 72	100	100	100	100	100
Boeing No. 73	100	100	100	100	100
Boeing No. 74	100	100	100	100	100
Boeing No. 75	100	100	100	100	100
Boeing No. 76	100	100	100	100	100
Boeing No. 77	100	100	100	100	100
Boeing No. 78	100	100	100	100	100
Boeing No. 79	100	100	100	100	100
Boeing No. 80	100	100	100	100	100
Boeing No. 81	100	100	100	100	100
Boeing No. 82	100	100	100	100	100
Boeing No. 83	100	100	100	100	100
Boeing No. 84	100	100	100	100	100
Boeing No. 85	100	100	100	100	100
Boeing No. 86	100	100	100	100	100
Boeing No. 87	100	100	100	100	100
Boeing No. 88	100	100	100	100	100
Boeing No. 89	100	100	100	100	100
Boeing No. 90	100	100	100	100	100
Boeing No. 91	100	100	100	100	100
Boeing No. 92	100	100	100	100	100
Boeing No. 93	100	100	100	100	100
Boeing No. 94	100	100	100	100	100
Boeing No. 95	100	100	100	100	100
Boeing No. 96	100	100	100	100	100
Boeing No. 97	100	100	100	100	100
Boeing No. 98	100	100	100	100	100
Boeing No. 99	100	100	100	100	100
Boeing No. 100	100	100	100	100	100

The heads on the western division of the Transcontinental route particularly have now reached a point where the Wasp



Installation of Wasp engines in Boeing mail plane showing the exhaust collector ring and exhaustor heater. No. 6 engine has its exhaust pipe jacketed with a sleeve and the hot air is led to the exhaustor outside canopy.

will be gradually replaced by the larger Pratt & Whitney "Eclipse." A number of Harvest engines are now on order by the Boeing Air Transport for this and other purposes. Boeing Air Transport proposes to use the withdrawn Wasp engines for installation in their new Boeing bi-engine passenger planes. These planes are to be put into service next spring between Chicago and San Francisco.

Performance the Only Test

A N OWNER of six Travel Air Biplanes says:

"They are all right and if they weren't we wouldn't be buying them. One may suddenly turn a machine in the lotus, and when I say it is good, you can depend upon it that it is. Possibly as other owners in the United States has the opportunity to test a machine under such severe conditions."

"One of these machines has had over 1500 hours flying time with no replacement or repairs. Another of them is used by the flying schools. It has had over 1000 flying hours and is still in good condition."

Practical experience; steady development; nothing but the best as materials and construction—these are the foundation stones upon which the success of Travel Air has been built—the reasons why it is steadily receiving the unqualified endorsement of the air-minded everywhere.

Descriptive Catalog on request

Travel Air Mfg. Co., Inc.

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THE airfoil fuselage of the Burnelli type lifts in excess of the equivalent wing area of the fuselage width. This utility of fuselage area allows heavier wing loading with increased speed range and also an extensive increase of L/D.

Some Advantages of the BURNELLI TYPE

Accessible multiple engine compartment
Extensive reduction of head resistance
Reduced turning moment on one engine
Fuselage lift reduces landing speed
Increased capacity of the fuselage
Structural efficiency and simplicity



267 PARK AVENUE, NEW YORK CITY



Truscon Hangar for the Ford Motor Manufacturing Corp., Farmington, L. I.

AIRPLANE HANGARS

Truscon Airplane Hangars are permanent and fireproof. They are assembled from standardized units which can be combined into buildings of any desired length and width. Being laid out in clear spans, their unobstructed floor space assures utmost freedom in handling ships.

Large Sliding Doors

opening the full width of the building, simplify the storing of planes. We furnish Steel Doors for any requirements.

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Manufacturers and Engineers
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Detail information and quotations on request.

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TOLEDO, OHIO

Please quote price on Hangar as follows:

Length _____ Width _____

1. Please send descriptive folder.

Name _____

Address _____



Side Slips

By ROBERT H. GORDON

Wonder What a Pilot Thinks About?

"Why do I always win the dumb students? Here this kid is near the end of his second hour and can't even keep the ship level. That wing's been low for two minutes now. Guess I'd better bring it up myself and give him the old glass. . . . Suck! It came up just straight. Guess the old glass isn't what it used to be though. Couldn't move him a bit. Not there getting at it. Then hold on to that report for class at all. Won't be long ago I would wish a washcloth with my glass. Must be getting old. No pep.

"Well, no wonder. Five hours a day in these crates would take the pep out of anybody. Oh yes, says Bill, when I came back, were going to get four new ships, with new latrines and two D-8's. 'Study of bones, he said. And you'll get lots of extra scrutiny. And where are the ships? In the factory that's where. And what are I doing? Damnedest, that's what. All day shipping and shuffling all over the sky with a lot of laymen students. Up and down. Up and down. Oh, it must be simply thinking to be a student! That's what they say. 'Dumb!' 'Maroon!' 'Huff! He'll be!'

"Wonder why I checked that chance to go in with the Old Man? Concrete contracting may not be so serious and thinking but it brings in the shakedown. And the shakedown was what we all want anyway. Well I'm making the money alright, but it's not getting in the bank. That's the trouble. Ought to be more in the bank. Never will though if I keep shuffling craps with Bill. I ought to know better. Any fellow's been in the Army. Not that I'd scare him of crying me, but ever since that time he shot and pulled up the money without looking at the film. I've been suspicious.

"Well, the business has no advantages though. The girls still think we're super-men. Hope that little blonde is still at the field when we get down. I certainly do like the little blonde. Especially when they sleep. Set her name in Thelma. I've got to improve my appearance though. Have to look more like an aviator. Running around in civilian old day like a plowman. Must get some riding boots and whipcord breeches. Leather coat too. That's the outfit that gets them. Hay out of the ship and swapper up and demand a cigarette. That's the way these kids do it. We do all the flying and they collect the glory. Look at the kid back here. All dashed out. Ervin gloves. Wonder he didn't get some too. Sluggers through a steep bank and then tells everybody he was steering. Guess I'd better shake him around a bit. Think I'll cut the gas and see what he does. Look at that. Look at that. Ed's been spinning just if I wasn't along. No use in leading him out up here though. He's still grinning. Well would I get him on the ground. I'd wipe that smile off straight. Can't get the right emphasis talking over my shoulder up here. Maybe my glass isn't what it used to be but I'll shut him in a sec still talk.

"Hee hee. Such a life. Wish we'd have a couple of airplanes and a Harvard to I could get a few days off. But they'd want me to fly through an earthquake. Give the student landings between clouds. That's what they'd say.

"Think I'd better see this lesson short, or that little blonde might get away. Twenty-five minutes. That's all this bird deserves. I'll let him the old pressure fell off. He won't know there hasn't been an instrument working in this ship for ten years. Wonder if he'll appreciate a real dummy side-slip landing when the sun cuts?"

Foreign Aeronautical News Notes

By Special Arrangement with the Transportation Division,
Bureau of Foreign and Domestic Commerce

Plan Moscow to Perna Air Service

Air service to connect Moscow with Tehran, Persia, according to a report in a Moscow publication. Two lines would be used, the Ukrainian Co. maintaining service from the Russian city to Baku and the Jukovsk Co. between Perna and Tehran.

During the summer season, flights between Moscow and Tashkent would be scheduled, it is said, at least twice a week. It is possible to maintain service between Baku and Tehran at all seasons, but the stretch from Moscow to Baku could only be open during the summer. The new line will permit travel between Baku and Tehran in 2 to 3 hours instead of the 3 days necessary at present.

According to agreement, the Ukraine Co. used by a plane once a week between Moscow and Perna and once from Moscow to Baku, while the Jukovsk Co. must fly a plane once a week between Tehran and Perna and once during that time between Tehran and Baku.

New Air Lines for Roumania

First steps are being taken for the establishment of air lines between Bucharest and Prague and between Warsaw and Belgrade, following a conference in Bucharest during which definite plans were formulated. These lines will be in addition to the service maintained by the Franco-Roumanian Co.

Poland Has Winter Air Service

Polish air service is being maintained throughout the winter months, according to a report from Gilbert Bedford, assistant chief commissioner at Warsaw. Regular schedules have continued between Warsaw and Moscow, Lemberg and Dnepropetrovsk, Cracow and Warsaw, Lemberg and Brest, Czechostrada, and also on the Brest-Warsaw line by the Aeroflot Co.

The company's report covering the month of November records 207 flights covering a distance of 43,600 km. Passengers carried numbered 354, merchandise 45,000 kg. and mail 3,007 kg. During the winter, the passenger index was kept at a temperature ranging between 50 and 60 degrees Fahrenheit.

Noble Plans New Transpolar Flight

Intentions of flying over the North Pole this May and landing in Canada, have been expressed by Gen. Umberto Nobile, Italian explorer and aircraft designer who accompanied Amundsen and Ellsworth over the Pole in the Norge in 1926, according to a report from Consul Gen. E. N. Lissail at Ottawa, Can. Nobile has asked the Italian Consul General at Ottawa to secure maps of the Canadian Arctic and as full information as possible concerning the territory. A flight would be made in the light, which is to be purely scientific.

Edo Pontoons and the WACO



THE old standby, the Waco 10 has been for a long time the most of an emergency, practical machine. On the Great Lakes, where it is used in the most extreme conditions, it is the only machine that can be used in the most extreme conditions. It is the only machine that can be used in the most extreme conditions. It is the only machine that can be used in the most extreme conditions.

Now the Waco 10 is equipped with the new 100 horse motor in place of the 50 horse motor, still being adapted for carrying passengers, and more practical, it is a new mark of safety for seaplanes. The new Atlantic Ocean is not so much for the coastal boats, the only mark of safety for seaplanes is not so much for the coastal boats. The only mark of safety for seaplanes is not so much for the coastal boats.

easy to fly, a good chaser, and a speedy ship. It is an ideal machine from pilot's point of view.

The ship offers great convenience to passengers. The front line shallow draft, both at the stern and at the bow. The ship may be brought close to the beach, and passengers can step right on to the deck and walk down to the shore. Two easy steps up the ladder and they are on the walking board of the wing. The ship is the only of the kind in the world with the unusually wide and comfortable cockpit. Very easy to get into, it is an exceptionally pleasant ship to fly.

More than 20 installations of Edo floats on Waco 10 and 10 seaplanes were made in 1937. Many more will be made in 1938. The pleasure flying for commercial work or for commuting it is difficult to find a seaplane better adapted to its purpose than a Waco in Edo form.



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has been a feature at the yearly dinner.

Col. Harry C. Fry, Jr., of the Air Corps Reserve, has been an active booster of aviation since the World War, and has just been granted a Private Pilot's License by the Department of Commerce. Colonel Fry is 52 years old and is now flying his own plane at Rodgers Field.

Mag. L. L. Henry, U. S. Army, who has been Medical Officer of the 90th Aero Division and Flight Surgeon of the 308th Observation Squadron of the Division, has just been transferred to Ft. Belvoir, Delaware, as Post Surgeon. Members of the Aero Club and Air Corps Reserve officers of the district gave him a farewell dinner at the club house of the Aero Club and presented him with a gift in appreciation of his possession of local connections.

The first of two new Pictorial Mailbags, powered with a Wright Whirlwind engine, was recently delivered to Clifford Bick, air mail contractor for the Pittsburgh-Cleveland air mail route, and immediately given a test flight and put into service. The second plane is expected to be delivered within a month.

More than 80 aids have been authorized to the airport survey committee of the local chamber of commerce, which has been placed in charge of selecting a location for the new municipal airport. Its members are thoroughly examining the area suggested.

William R. Root of the Steel Air Service of Detroit was a recent visitor to Pittsburgh where he made addresses before the chapters of commerce of Pittsburgh and McKeesport. He also discussed plans for his Cleveland, Pittsburgh, and Philadelphia line, which he plans to put in operation this spring.

St. Louis, Mo.

By M. L. Alexander

The revolving beacon marking Lambert-St. Louis Field for night-flying airplanes, has arrived at the field and has been set up. It is the gift of Mrs. Adolphus Knapp III, who donated \$10,000 for the light and its standard.

The city's airport ordinance already has received favorable approval of the afternoon Ways and Means Committee and is now with the Board of Estimate and Apportionment, members of which have declared they are strongly in favor of the measure.

Of the bid's appropriation, \$48,000 is available for lighting and grading the field of 240 acres. One of the early projects is to be the construction of runways so that planes may have no trouble in getting on and off the field during the heavy spring thaws. Expenditures are being made to determine the best type of drainage for the runway, which probably will be maintained by means of having the gravel under covering. The runways are to be laid out so that they may be incorporated in the improvements of the larger field if the voters pass the proposed \$1,000,000 bond issue next November for the enlargement and permanent acquisition of the airfield.

City Operation Brings Conjecture

Just what effect the acquisition of the field by the city will have on its operation is a subject of speculation among them. For the past four years O. E. Root has been in charge of the airfield, deriving his pay from rentals for hangar space paid by the various firms. Root's appointment comes, however, from Maj. Albert Ford Lumbert, who under the terms of the proposed airport ordinance will head the city's bid to the city at \$100 a year and lease the balance for \$50,000, the latter figure being applicable as a first purchase payment when the city decides to buy the airfield.

So far, no move has been made by the city to prosecute methods of management of the field, although that would ap-

pear to be within the city's rights when it takes control. The field then are agreed, however, that the direction of the airport should be absolutely divorced from politics, and that the managers should be a qualified airport trust similar with the problems of municipal air organizations.

Some of the pilots have suggested that in addition to his other duties the manager, as under the present system, shall have absolutely no supervision over flying, with the power to suspend pilots who are careless or imprudent in the handling of their planes. Doubtless one proposal the manager's "grounding" right would be effective only for 48 hours, with the provision that in the meantime a board of five sit on the case of the offending flyer and either advise the "grounded" pilot, or recommend him, as it may fit.

The possibility of air transport were demonstrated recently by a weekly journey in which J. A. Quinn of Fresno, Calif., president of Budd & Quinn, master doctors, met a business manager in which he had to quickly get to Fresno, 112.

Quinn left San Francisco on a mail plane of the Doran Transport Co., at 5 A. M. Wednesday, headed by the city's following morning, attached into the cockpit of a Robertson mail plane piloted by Chief Pilot Martin Gurney, and was in Fresno at 9:30, having made the trip from San Francisco in 54 hr., 30 min. including stops.

Mail Pilot Makes Fast Time

Flying to Chicago with the mail, from St. Louis the same day, Pilot Gurney took off from Lambert-St. Louis Field at 4:30 P. M. and landed at the Chicago Field at 6:30 making what is believed to be a record speed run for the 280 mi. mail route. Subtracting ten minutes for the two five-minute stops at Springfield and Peoria, he made the trip in 1 hr. 43 min., averaging 163 m.p.h., or 2.8 mi. a minute.

The speed was made possible by a heavy tail wind, estimated to have had a velocity of 50 m.p.h. in 1000 ft. Just before Gurney took off a flying student of the Farbs Airline, in a Standard aircraft, in 1000 ft. and traveling his engine down held his plane virtually motionless over the field for three or four minutes, the wind driving his plane backwards as fast as its engine could turn forward.

Louis H. Smith, one of Gurney's flying mates, gave me a lesson a severe problem when he was forced to bring his DIT down on a field on the Mississippi River near St. Louis on the southwestern trip. His main machine took too dry as he crossed the river, and he was flying so low, because of bad visibility, that he was forced to come down rather than attempt to cut in his reserve tank. Although he was out of water at the time he managed to get down on the field in such a light spin that there was no possibility of flying the plane out again. The plane was recovered later after some work.

Springfield, Mass.

By Charles Benson Cole

Municipal airport prospects for Springfield have been alternately bright and dark in recent weeks. The city and State of official opinion on the airport have swayed around the new chairman of the city airport committee who took office in January. Controversy was precipitated by his statement that a waiting policy was desirable in order to make sure that all non-residents were fully satisfied before assuming the expense of a municipal airport. It was further stated that the three spending companies in town had their own airports and that a municipal airport was therefore unnecessary.

In view of these points, he further stated that he saw no way of saving the city a vast sum if the city airport committee could spring. Probed and this announcement, however, and it was



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decided that an earlier meeting was necessary.

There has been no meeting since the interest of the national airport by the aviation community of the city, but a meeting was planned which would attempt to secure assistance of all the operating companies and others looking to the national airport project in order to reach an agreement and present a united front to the city authorities.

The failure of action in the airport matter has caused an undesirable alarm among the flying men of the city as the city has previously stated that an airport is one of the questions for this year. The city will have to depend for the money upon the private flying fields. These are not equipped with hangars for storing planes and there are in sight increasing facilities. Lack of proper accommodations has meant a dropping of practically all flying last night spring.

Harry Hermann, encouraged by the warm weather lately in January, sold a Swallow to the L. & H. Aircraft Co. of Hartford, Conn. Harry trapped the plane in Danvers Field, Hartford, and set it up. A last flight followed.

Warm Weather Tempts Hire Out

James A. Hanna, pilot of Massachusetts Airways, had reported to stay on the ground until spring but was tempted by the warm weather and undertook the first flight of a solo, contrary to his made over the city in 1930. He was a student with him.

Massachusetts Airways recently announced that it had been granted the Eastern Canada agency for the Eaglerock. This company is now a wide distributor in New England. Hanna is sole representative plane in being given by the company a commission of a book business in the spring. Agents are being appointed according to districts and about as far as has been announced. These include an agent at Providence, R. I., Northampton and Boston.

The first graduation exercises of the Springfield General School were held recently. The class started in the fall in engine work and later advanced to airplane study. About 30 men completed the course.

Diplomas were granted by Lt. Col. Elmer Hall, head of the school and formerly instructor in a course in aeronautics at the University of California, extension department.

More than 30 men applied for the new class which started while a group of about 15 advanced from the engine work to the airplane studies. The school has considerable equipment in engine and airplane parts.

The first monthly meeting of the Aircrafters, a new flight club organized here of members and graduates of the Springfield General School, was held in cooperation with the production. A banquet was also held.

Hartford, Conn.

By E. J. Fisher

Lt. Col. Carl A. Dixon and Lt. Col. Charles Wright, both members of the Civil Observation Squadron Contracting Division, have joined the L. & H. Aircraft Co. pilot instructors to assist Lt. Col. Oswald M. Mather. Charles Wright, who has the L. & H. Co. has also qualified as pilot and instructor for the state's license under the supervision of Lt. Col. Harry Gremmen of the Aviation Commission's office.

Two more new hangars are about completed and the L. & H. Aircraft Corp. and the L. & H. Aircraft Co. are expected to move into their new quarters soon. The hangars are most ideal in size and have the recently acquired land to the south of the present field. In the meantime the Municipal Hangar, which has been built but has not yet been used, will be used in an operating company who is sure to meet upon the company will not get it in expected by the Interstate Airways will take over the project company.

any are not contemplating the construction of a larger plant than at this time.

The L. & H. Aircraft has taken the sales agency for the "Challenge" airplane and will have New England and western New York as its territory.

Among the recent visitors was Harold Robinson flying one of the Westinghouse Fighter Ultramotors. He arrived from England by the "Challenge" plane and will have the Pratt and Whitney Aircraft factory in this city where the "Wasp" engine is manufactured. The 30 ordered by the Fighter Aircraft Co. are to be used mostly for the new three-engine transports now being built in Whitehall, W. V. Gen. Thomas A. McCulloch of the Pratt and Whitney Aircraft Co. has been called into active duty by the United States Marine Corps and is now flying in Nicaragua. The change is made by special arrangement with the War Department in order that the Pratt and Whitney Co. might have an opportunity to observe its engine now being used by the army and Navy under actual service conditions in the Tropics. Lt. Col. William B. Whendley, Pratt and Whitney test pilot, is at McCulloch Field serving the "Hornet" recently shot in the U. S. Army.

In spite of the advanced season, there is still considerable flying here at the General Aviation Co. and are looking up for some responsible for this fact. Some severely athletic men are flying during the week and Sunday visitors prefer more opportunity for flying.

Donald Stark and C. F. Olson have mentioned the mail one of the General Aviation Co. and are looking up for some responsible for this fact. Some severely athletic men are flying during the week and Sunday visitors prefer more opportunity for flying.

Denver, Colo.

Establishment of an independent commercial airport has been begun here by the Denver Union Airport, Inc., a subsidiary of the Rocky Mountain Airlines, Inc. The site is a corner of Lerway Field and is of 284 acres in area. O. H. Huggins, leader of Brooks Field at San Antonio, Texas, leads the company.

The location is remarkably suitable for a field, it is level, being practically the entire acreage is naturally level and is completely available, therefore, for an airport. Since the field will easily accommodate four 2000 ft. runways in any three directions, is clear of obstructions, and is located on a two hundred four and one-half miles from the post office in the center of the Denver business section, it is thought to be everything in its favor for class A classification.

A steel hangar is to be constructed on the new field, and Rocky Mountain Airlines expressed to be moved to the airport.

Directors of the Denver Union Airport, Inc., include Paul J. Lammie, Charles B. Egan, W. H. Edwards, George Gillingham and James B. Hill. These men are also directors of the Rocky Mountain Airlines, Inc.

Club and School Organized

As in the aforementioned group recently organized the High Aviation School, Inc., and also the High High Wing Club. The latter organization is planning to build a building at the new airport of Spanish architecture with the steel and glass structure enabling those inside to observe the flying activity without. The club also plans the purchase of new light planes. An experienced pilot will be put in charge and will give instruction in flying.

According to present arrangements, the club will be in three flights. The first will include students, the second pilots with experience, and the third the members who work a good time in the air as passengers. The plan is similar



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Wassner-Tokio-Wassner (15,356 miles) in 130 hours by Linsenkant Oelrichs (450 hp engine).

Puerto-Rico (6,580 miles) in 6 days, by Pelletier-Ducay and Canal (450 hp engine).

Tour of the Eastern Mediterranean (3,550 miles) in 43 hours 30 minutes elapsed time, by Pelletier-Ducay and Dumas (450 hp engine).

Flight crossing of South Atlantic, by Suzanne de Berres (450 hp engine).

Puerto-Santiago-Belgrade (5,040 miles) in 50 flying hours by Soudey and Heyde (450 hp engine).

Cross of Eastern Europe (5,040 miles) in 5 days by Meyer Weiss and Jankovic (450 hp engine).

Cross of Mediterranean (5,040 miles) in 6 days by Pelletier-Ducay and Dumas (450 hp engine).

Croix Méditerranée, 1925 (Capitaine Pelletier-Ducay), 1929 (Capitaine Chaffin).

Croix Méditerranée, 1925 (Adjudant Babier), 1928 (Adjudant Duroy).

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